REMARKS

Claims 1-199 are now pending in the application. Claims 195-199 have been withdrawn from consideration. Claims 57, 59, 69, 156, and 158 have been amended to address a mere informality. The amendments to the claims contained herein are of equivalent scope as originally filed and, thus, are not a narrowing amendment. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. §§ 102 AND 103

Claims 1-194 stand rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Chen et al. (U.S. Pat. No. 6,471,936) (hereinafter "Chen"). This rejection is respectfully traversed.

The Chen reference relates to forming an improved hydrogen-sorption material. In particular, the Chen reference provides methods of doping a carbon-based sorbent to enhance absorption and/or chemisorption of hydrogen on the carbon-based sorption materials. Col. 2 lines 35-37, 46-50; Col. 3 lines 8-12. The Office Action points to the doping process that creates an alkali-metal carbon-based sorbent as anticipating and/or rendering the claimed invention obvious. However, anticipation requires the disclosure in a prior art reference of each and every element, as set forth in the claims. *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 1 USPQ.2d 1081, 1087 (Fed. Cir. 1986).

Chen has no teaching or suggestion of a method of producing hydrogen by conducting a reaction between a hydride composition and a hydroxide composition.

While Chen describes methods of producing hydrogen, they are by reversible sorption processes on a doped carbon-based material, not by conducting a reaction between a hydride composition and a hydroxide composition.

Specifically, Chen relates to a process for preparing the doped carbon-based sorption material, where it describes reacting a carbon material with an alkali metal salt under high temperature treatment with either inert gases or a reducing environment (such as H_2) gas, to calcine the carbon material. Chen states that oxygen should be avoided during the calcination process; otherwise, the carbon-based sorption material will have a reduced ability to take up hydrogen (for subsequent reversible hydrogen sorption). Col. 3 lines 46-51; Col. 5 lines 25-27. First, since oxygen should be avoided during the doping process, Chen fails to teach or suggest formation of an oxide composition. Second, Chen states that it is preferred that the alkali metal salt does not contain oxygen, which presumably excludes or teaches away from the use of a hydroxide. Col. 3 lines 49-50; Col. 5 lines 27-28.

Moreover, Chen lacks any description or suggestion to react a hydride composition with a hydroxide composition to form hydrogen. Chen only provides for a reaction between carbon with an alkali metal salt (preferably not containing oxygen), not a reaction between select alkali metal salts. While Chen recites various alkali metal salts that can be used to dope the carbon-based material, there is no suggestion that mixtures or combinations of these alkali metals salts could, or more importantly should be selected and used in an independent reaction.

Thus, Chen fails to describe a process of generating hydrogen, such as is recited in independent Claims 1 and 178. It should be noted that there is no disclosure or

suggestion of producing hydrogen in the calcination process, particularly where hydrogen is intentionally present as a reducing atmosphere. The presence of hydrogen for such a purpose would thereby prevent potential reactants from forming products such as hydrogen and/or oxides by Le Chateliers Principle. See for example, Applicants' Specification at Paragraph 76.

Independent Claim 82 is directed to a method for releasing hydrogen from hydrogen storage materials. The respective hydrogen storage materials comprise a hydride composition and a hydroxide composition. The method further recites conducting a reaction between the first and second storage materials for a time and temperature sufficient to produce a reaction product comprising an oxide material, as well as producing hydrogen. The Chen reference has no teaching or suggestion of a hydrogen storage material formed of a hydride and a hydroxide that generates both hydrogen and an oxide material. In fact, the Chen reference teaches away from any such selection and combination of alkali metal salts, in stating that oxygen-containing alkali metal salts should be avoided, as discussed above.

Similarly, independent Claim 111 recites a hydrogen storage composition having a hydrogenated state (having hydride and hydroxide) and a dehydrogenated state (having an oxide). Chen has no disclosure and provides no motivation to one of skill in the art to provide a hydride and/or hydroxide as a hydrogen storage composition itself. Rather, the only description in Chen of a hydrogen storage material is an alkali-metal doped carbon-based sorbent that reversibly stores H_2.

For these additional reasons, the following claims are patentable over the Chen reference. First, Claims 6, 16, 18, 26, 54-69, 98-99, 114, 115, 125, 191, 192, and 193

recite a hydroxide composition having a stoichiometric amount of hydrated water (represented by the formula: $MII^{y}(OH)_{y}\cdot wH_2O$). The Chen reference fails to disclose or suggest conducting a reaction between a hydrated hydroxide composition and a hydride composition to form hydrogen and an oxide. Such hydrogenated storage reactions and systems provide unexpectedly rapid and efficient production of hydrogen at high yields.

The Chen reference further fails to disclose or suggest a complex hydride composition having two distinct cations that is reacted with a hydroxide, such as is recited in Claims 10, 43, 46-52, 55, 67-69, 85, and 119. Similarly, Chen fails to disclose or suggest a complex hydroxide composition having two distinct cations that is reacted with a hydride composition (Claims 11, 86, 120) or formation of a complex oxide from the reaction between a hydride and a hydroxide (Claims 17, 116). Chen teaches away from selecting an oxygen-containing alkali metal salt, and has no suggestion to have a hydrated oxygen-containing hydroxide.

There is no disclosure or suggestion in Chen of the specific combinations of hydride and hydroxide reactants or of the specific reaction mechanisms shown in Claims 28-69, 94-97, and 136-177. These reactants and reactions were previously unknown as being capable of producing hydrogen, and are particularly advantageous for producing hydrogen at relatively high yields at industrially practicable temperature and pressure conditions.

Claims 107 and 108 are directed to methods of conducting the reaction, where the products, oxide and/or hydrogen are removed from the starting materials, which is not shown in Chen. In fact, Chen teaches away from such a proposition by requiring a reducing atmosphere of hydrogen.

Independent Claim 187 is directed to a mixture of a hydride, a hydroxide, which promotes release of hydrogen in the presence of a catalyst, elevated temperature, or both. In Claims 109 and 110, the reaction is conducted in the presence of a catalyst, which is further not described or suggested in the Chen reference. Chen provides no suggestion of conducting such a reaction, notwithstanding conducting such a reaction in the presence of a catalyst.

For all of these reasons, Applicants respectfully submit that the Chen reference fails to teach each and every limitation of the methods and composition claims and does not anticipate Claims 1-195. Reconsideration of these claims is respectfully requested.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the

Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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By: Jennifer Woodside Wojtala

Anna M. Budde
Reg. No. 35,085

Jennifer M. Woodside Wojtala
Reg. No. 50,721

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

CORRESPONDENCE ADDRESS:
Kathryn A. Marra
General Motors Corporation
Legal Staff - Mail Code 482-C23-B21
PO Box 300 - 300 Renaissance Center
Detroit, Michigan 48265-3000
Ph: 313-665-4708
Fax: 313-665-4976

JMW/slg